

Work Order ID 67210

Thursday, March 10, 2011 2:30:46 PM



Page 1

Item ID: D407-667-205

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Aft

Start Date: 3/10/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 3/18/2011 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: H Date: 11-03-10 Tooling: _____ Date: _____

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr

Revision Nbr

D407-667-245

Rev F

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile and create labels as per PPP D407-667-205 CHG006

8/11/12

11-03-10

CHG007 Per DSI 9650

110

0.00



Pick Kit

Packaging

Memo

0.00

Packaging

Packaging

11-03-31

120

0.00



BENDING MACHINE - CROSSTUBES

CNC Bend 1

Memo

0.00

CNC Delta 100 Bender

1-Bend tube as per Dwg D407-667-245 using CNC bender program 407 Aft and Folio 21

11-03-31

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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NOTE: Date & initial all entries

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Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

130

QC15- Crosstube Dimensional Check

0.00



QC

Memo

0.00

Su 10/3/11

PK

PK

Quality Control

Pass in front
of PAE.

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

140

0.00



Crosstubes

Crosstubes

Memo

0.00

Crosstubes

1-Drill pilot holes in tube using drill Jig DT8583 & DT8584 as per Dwg D407-667-245. Drill all (3) top holes.

2-Drill and Ream all holes in tube to finish size using drill Jig DT8583 & DT8584 as per Dwg D407-667-245. Check dimensions between holes on all four sides.

3-Flip tube and switch drilling Jigs from right to left, left to right. Locate Jigs off existing holes using "T" pins.

4-Drill pilot holes using drill Jig DT8583 & DT8584 as per Dwg D407-667-245. Drill only the top (2) holes.

5-Drill & ream the top (2) holes to finish size using drill Jig DT8583 & DT8584 as per Dwg D407-667-245.

6-Drill Aft rivet holes using drill Jig DT8789 as per Dwg D407-667-245. Note: Aft side has 3x top holes.

7-Drill Fwd rivet holes using drill Jig DT8789 as per Dwg D407-667-245. Drill only the top (3) holes.

8-C'sink holes as per Dwg D407-667-245. Allow rivet to sit below surface to compensate for paint.

9- Scribe tube to identify on the inner chamfer in the cuff D# and B#

10-Deburr & Inspect for surface damage. Repair damage within limits as per

BB 11/03/31

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Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Dwg D407-667-245

150

Crosstubes Chemical Conversion

0.00

11-4-4



HandFXtube

Memo

0.00

Hand Finishing Crosstubes

160

QC3- Inspect Part Finish

0.00

8/4/04



QC

Memo

0.00

Quality Control

170

QC5- Inspect part completeness to step on W/O

0.00

8/4/04



QC

Memo

0.00

Quality Control

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DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

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Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180	Outsource process - NDT per QSI038 4.1	0.00							
	Outsource2								
	Memo	0.00							
	Outsource process - NDT								
	Liquid Penetrant Inspection as per QSI 0380								
	Issue P/O: 13961 LPI as per ASTM 1417								
	Level 2 Attach copy of NDT results to work order								
190	Packaging	0.00							
	Packaging								
	Memo	0.00							
	Packaging								
	Ensure copy of NDT results attached to work order.								
200	QC5- Inspect part completeness to step on W/O	0.00							
	QC								
	Memo	0.00							
	Quality Control								

CL 11/04/05 ①

P 11/4/05 ④

M 11 04 05 ①

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QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

210

0.00



SprayPaint

SprayPaint

Memo

0.00

1-Prime inside and outside crosstube as per QSI 005 4.2
2-Paint outside crosstube with White Imron as per QSI 005 4.2

PRIME:

Start Time: _____

Finish Time: _____

11-04-12

PAINT:

Start Time: _____

Finish Time: _____

11-04-13

BT 11 04-13



220

QC14- Inspect Spray Paint

0.00



QC

Memo

0.00

Then, Wrap in plastic bag to protect from scratches

11 04 14 1

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Dart Aerospace Ltd

W/O: 67210		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	
11-04-12	210	<ul style="list-style-type: none">- Prime entire outside surface of tube allow 4hrs flash time (using temp epoxy primer)- clear coat inside surface of tube using Imron 2.1-HG-CAT is per manufacturer's specs (coat inside of tube slightly wider than 2" wide and 2" away from cuffs)	ET	11-04-13	1	11-04-13	11-04-14	
11-04-12	210	<ul style="list-style-type: none">- allow to dry over night- mask off inside of tube 2" wide + 2" away from each cuff (inspection window) scuff exposed primer using scotchbrite + paint using Imron 333 white	ET	11-04-13	1	11-04-13	11-04-14	

Part No: D407-667-205 PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

230

0.00



Crosstubes

Crosstubes

Crosstubes

Memo

0.00

1-Install abrasion strips as per QSI 035 using DT8674. Install chafing shield as per Dwg D407-667-245. Note: (3) top holes should be facing up.

2- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

3-Install support with magnobond and install clamps as per Dwg D407-667-245 using installation jig DT9025. Torque clamps to 80-100 in lb

A/R Magnobond Batch: 116671
EXP: 11/06

4-Install nut plates as per Dwg D407-667-245. Touch-up rivet heads with Imron paint.

BT 11-04-19
(P10)

240

0.00



QC5- Inspect part completeness to step on W/O

QC

Memo

0.00

Quality Control

11 04 21 (1)

W/O: 67210		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	
11-04-14	230	install chafing shields using Pro Seal #/S 890 B-2 M 117395	ET	11-04-19	-	104.14 OSI 042	nlm 11-04-21	

Part No: D407-667-205 PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Customer:

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Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

250

Pick Kit

0.00



Packaging

Memo

0.00

Packaging

11/4/21 SP

260

QC4- 100% Inspect kits for completeness

0.00



QC

Memo

0.00

Quality Control

8/6/12/1

FO

270

Packaging

0.00



Packaging

Memo

0.00

Packaging

Identify and in kanban rack
Location: 37

Rev F

11/4/21 SP

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Run Start



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Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

280

QC21 - Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

11/4/25
MF
11-04-21

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Picklist Print

Thursday, March 10, 2011 2:30:53 PM

Page 1

Work Order ID: 67210

Parent Item: D407-667-205

Parent Item Name: Crosstube Aft



Start Date: 3/10/2011

Required Date: 3/18/2011

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:C 05.09.02 Add holes for compatibility with Bell Skidtubes KJ/JLM
IPP Rev:D Added Magnobond, Rubber Cushion & Clamps 07-02-19
JLM

****CHANGE TO CHG 005 - IF USING D2894-1 B35578 OR GREATER****
IPP Rev:E 08-05-22 add comment in seq. 6 and QC15 and QC5 DD verified
by:EC
IPP Rev:F 08-06-12 add comment in seq. 24 DD verified by:EC
IPP Rev:G 08-08-19 revE as per dwg DD verified by:EC
IPP Rev H 09.01.06 ECN 08-562 EC verified by:DD IPP Rev:I
10.04.07 revise route seq. in bom DD verified by:JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D407-667-205TRN		Manufactured	No			110	Each	4.0000	1	1			
Crosstube Turning Detail													

Location	Loc Qty	Loc Code
LG	4	
66263	1	
66264	1	
66265	1	
66266	1	

AN960JD516 NAS1149D0563J Purchased No
Washer

Location	Loc Qty	Loc Code
ST298	34	
103694	18	
107534	12	
109287	4	

SAD 11-03-31

M117291 11/14/10

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Parent Item Name: Crosstube Aft

Start Date: 3/10/2011

Required Date: 3/18/2011

Start Qty: 1.00

Required Qty: 1.00

D2856-400 Manufactured No 230 f

146.2980 1.288 1.355789



Abraison Strip

N/A
w/pen Pto
@ step 230

Location

Loc Qty

Loc Code

ST403

146.2980421

56626

0.00004211

59920

43.381

63735

102.917

D2873-043 Manufactured No 230 Each

18.0000 2 2



Nut Plate Assembly

66898 x 2

Location

Loc Qty

Loc Code

LG

16

65375

16

ST

2

60981

2

D2873-045 Manufactured No 230 Each

36.0000 2 2



Nut Plate Assembly

67748 x 1

Location

Loc Qty

Loc Code

LG

36

60982

4

63498

1

65132

11

65992

20

x1

W/O:		WORK ORDER CHANGES					
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Start Date: 3/10/2011

Required Date: 3/18/2011

Start Qty: 1.00

Required Qty: 1.00

D2894-1 Manufactured No

230 Each

10.0000

1 1



2.750 Support



BT 11-04-19

Location

Loc Qty

Loc Code

LG

10

43713

3

43881

7

X1

D3190-1 Manufactured No

230 Each

20.0000

2 2



Chafing Shield



BT 11-04-19

Location

Loc Qty

Loc Code

LG

20

58569

20

X2

D3595-063-450 Manufactured No

230 Each

73.4590

2 2



RUBBER CUSHION



BT 11-04-19

67353

Location

Loc Qty

Loc Code

LG

68.45897368

53775

5.97897368

58161

3.56

59580

0.12

61465

4.68

63960

10

65656

2.12

67067

42

ST415

5

64171

4

64300

1

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Parent Item Name: Crosstube Aft

Start Date: 3/10/2011

Required Date: 3/18/2011

Start Qty: 1.00

Required Qty: 1.00

MS20601-AD4W8

Purchased

No

230

Each

282.0000

14

14



RIVET



11.04.20

Location

Loc Qty

Loc Code

LG

178

116119

78

117106

100

ST322

104

112203

104

MS21920-22

Purchased

No

230

Each

48.0000

4

4



Clamp(per MIL-DTL-8783C)



117279 x 1

11.04.19

Location

Loc Qty

Loc Code

LG

48

114077

2

116207

46

MS21920-25

Purchased

No

230

Each

88.0000

2

2



Clamp(per MIL-DTL-8783C)



-24

1104550

11.04.19

Location

Loc Qty

Loc Code

LG

63

113281

0

114759

5

114901

3

115278

1

115849

12

116264

42

ST451

25

109181

1

113281

5

113282

18

113744

1

P/O

W/O: 67210		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector
11-04-20		use MS21920-24 - 25 is out of stock - 26 too long	BT	11-04-20	(11-04-21	

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Thursday, March 10, 2011 2:30:54 PM

Work Order ID: 67210

Parent Item: D407-667-205

Parent Item Name: Crosstube Aft

Start Date: 3/10/2011

Required Date: 3/18/2011

Start Qty: 1.00

Required Qty: 1.00



AN5-10A

Purchased

No

250

Each

210.0000

10

10

Bolt

Location

Loc Qty

Loc Code

ST337

210

115589

50

115700

10

116704

50

116924

50

117010

50



AN5-32A

Purchased

No

250

Each

131.0000

4

4

Bolt

Location

Loc Qty

Loc Code

ST340

131

115016

21

115108

50

115589

60



AN5-34A

Purchased

No

250

Each

80.0000

4

4

Bolt

Location

Loc Qty

Loc Code

ST340

80

115835

20

116003

20

116704

20

117010

20

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

Page 6

Thursday, March 10, 2011 2:30:54 PM

Work Order ID: 67210



Parent Item: D407-667-205



Parent Item Name: Crosstube Aft

Start Date: 3/10/2011

Required Date: 3/18/2011

Start Qty: 1.00

Required Qty: 1.00

MS21042LS

Purchased

No

250

Each

970.0000

4

14



Nut



1146152

Location

Loc Qty

Loc Code

ST139

26

114813

26

ST300

944

115594

248

116105

496

116548

200

Thursday, March 10, 2011 2:30:54 PM

Shop Packet Print

Page 6

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D407-667-205 PAR #: _____ Fault Category: X-Tube NCR: Yes ☐ No ☒ DQA: _____ Date: _____

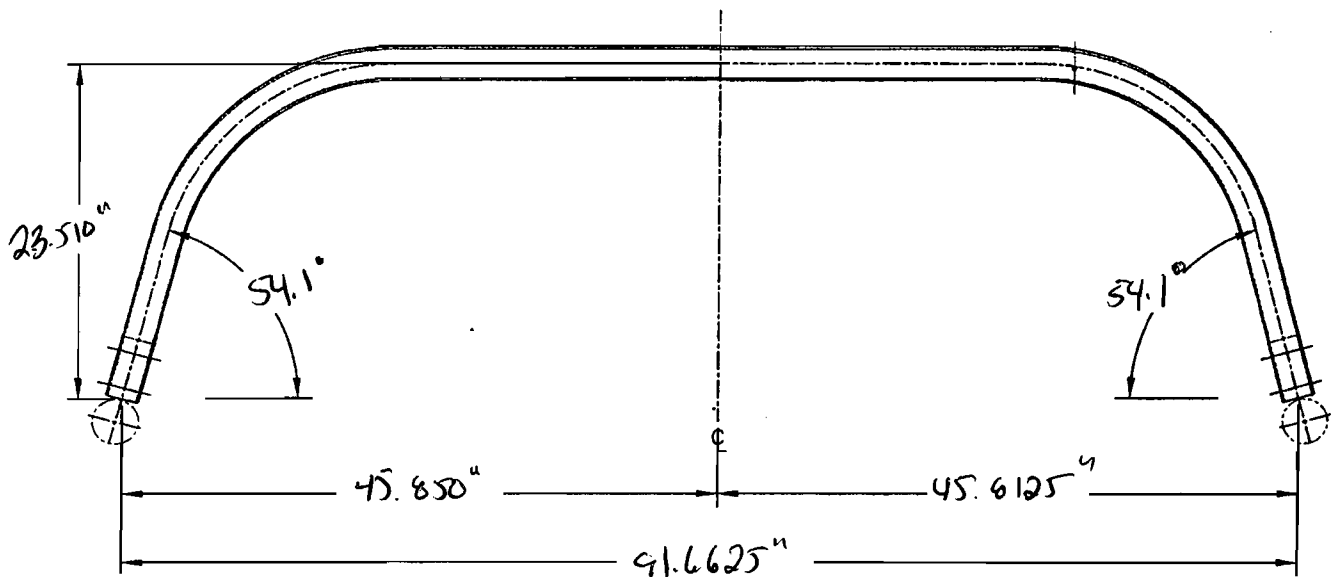
Resolution: Use as in Disposition: use as in QA: N/C Closed: _____ Date: _____

NCR: <u>67210</u>		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
11.03.31	120	Tube is bent too narrow 45.8125/45.850. RC:	<p><i>AP</i> 11.03.31 PS/042</p>	Acceptable	N/A	<p><i>Go</i> 11.04/26</p>	<p><i>AP</i> 11.03.31 PS/042</p>	<p><i>Go</i> 11.04/26</p>

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	67210
Description: Crosstube High Aft (407)		Part Number:	D407-667-205
Inspection Dwg: D407-667-245 Rev: F		Page 1 of 1	

Required Dimension	Min	Max
Height	23.46	23.58
1/2 Span	45.86	45.98
Angle	54	56
Total Span	91.72	91.96



Comments
Tube is narrow, Acceptable CP 11.63.31

QC15 Inspection	8
Date	11/03/31

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	09.06.22	Dwg Rev updated	KJ	

45.8500
45.6125
91.6625

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Item	QTY -245	PART NUMBER	DESCRIPTION
1	X	D407-667-245	CROSSTUBE ASSEMBLY (407 HIGH AFT)
2	1	D6011-115	CROSSTUBE
3	2	D2856-400-773	ABRASION STRIP
4	2	D2873-043	NUT PLATE
5	2	D2873-045	NUT PLATE
6	1	D2894-1	SUPPORT
7	2	D3190-1	CHAFING SHIELD
8	2	D3595-063-430	RUBBER CUSHION
9	14	MS20601AD4W8	RIVET (OR NAS9302B-4-8)
10	4	MS21920-22	CLAMP
11	2	MS21920-25	CLAMP (OR MS21920-24)
12	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947- 100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6011-115
FINISHED LENGTH = 112.91±0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D407-667-245" AND BATCH NUMBER ON
INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 27.7 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 6 PASSES. MAXIMUM TUBE FLATTENING DUE TO
BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2894-1 CENTER SUPPORT USING A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND
6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO
PACKAGING.
- 13) INSTALL MS21920-25 CLAMPS WITH D3595-063-430 RUBBER CUSHIONS TO SECURE D2894-1
SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE
SUPPORT.
NOTE: MS21920-24 CLAMPS CAN BE USED TO ACCOMMODATE VARYING DIAMETERS.
ENSURE THERE IS A MINIMUM OF 1.5 THREADS IN SAFETY ON THE NUTS.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE
OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS
SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT
LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 15) INSTALL D2856-400-773 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF
CROSSTUBE, PER QSI 035.
- 16) INSTALL D3190-1 CHAFING SHIELDS SO THAT OVERLAP IS ON BOTTOM SIDE OF CROSSTUBE
OPPOSITE D2894-1 SUPPORT.
- 17) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN
SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY
RETURNED
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 67210

PL11-08-10

RELEASED
05/11/12

F	REFORMAT NOTES TO NEW STANDARDS (ZN 88-1); RELOCATED FLAG # 6 (ZN A8-3) PER NCR 210; REMOVED REF. & ADD TOLERANCES (ZN C6-3, C4-3 & D2-3)	RF	08.11.06
E	8.02 AND 8.53 WERE 8.40 AND 8.90 (ZN D5-2); REORGANIZED VIEWS AND REFORMATED DRAWING TO CURRENT STANDARDS. REASONS: CLAMPS MOVED 0.375 TOWARD CL TO ELIMINATE INTERFERENCE WITH AIRCRAFT MOUNTS. REFERENCE: PAR#08-21 AND ECR#1225	MB	08.07.24
D	ADD VIEW FOR OEM SKID HOLES, ROTATE ORIENTATION OF CLAMPS SECTION F-F, REMOVE -851 ABRASION STRIP, ADD MAGNOBOND 6398, ADD CUSHION	PH	07.02.07
C	ADD HOLES AND NUT PLATES FOR COMPATIBILITY WITH BHT/AA SKIDTUBES	PH	05.07.26
B	ADD CHAFING SHIELD	CP	03.05.21
A	NEW ISSUE	CP	02.05.13
REV.	DESCRIPTION	BY	DATE
DESIGN	<i>RF</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	<i>RF</i>		
CHECKED	<i>RF</i>	DRAWING NO.	REV. F
MFG. APPR.	<i>RF</i>	D407-667-245	SHEET 1 OF 4
APPROVED	<i>RF</i>	TITLE	SCALE
DE APPR.	<i>RF</i>	CROSSTUBE ASS'Y (407 HIGH AFT)	NTS
DATE	08.11.06	<small>COPYRIGHT © 2002 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS TO BE RETURNED TO THE EXPIRES CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

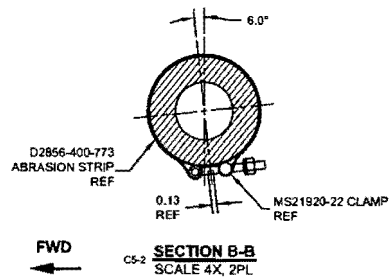
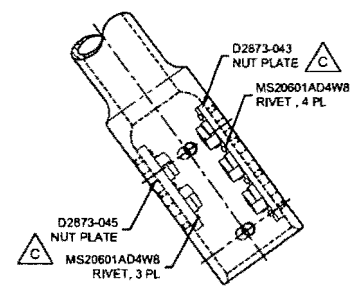
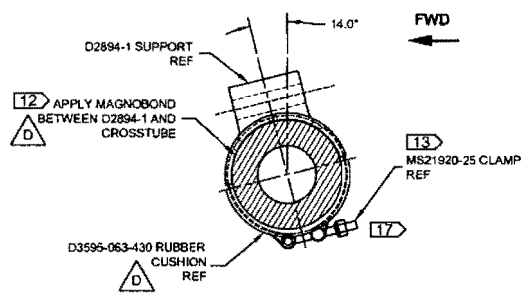
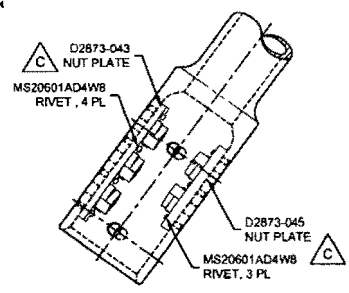
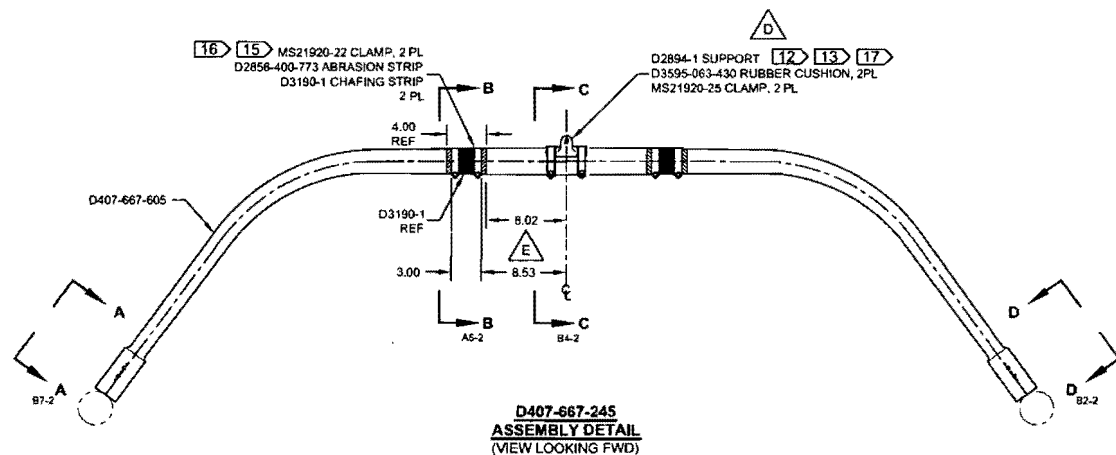
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



RELEASED

DESIGN	9	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	17	DRAWING NO.	REV. F
MFG. APPR.	17	D407-667-245	SHEET 2 OF 4
APPROVED	17	TITLE	SCALE
DE APPR.	17	CROSSTUBE ASS'Y (407 HIGH AFT)	NTS
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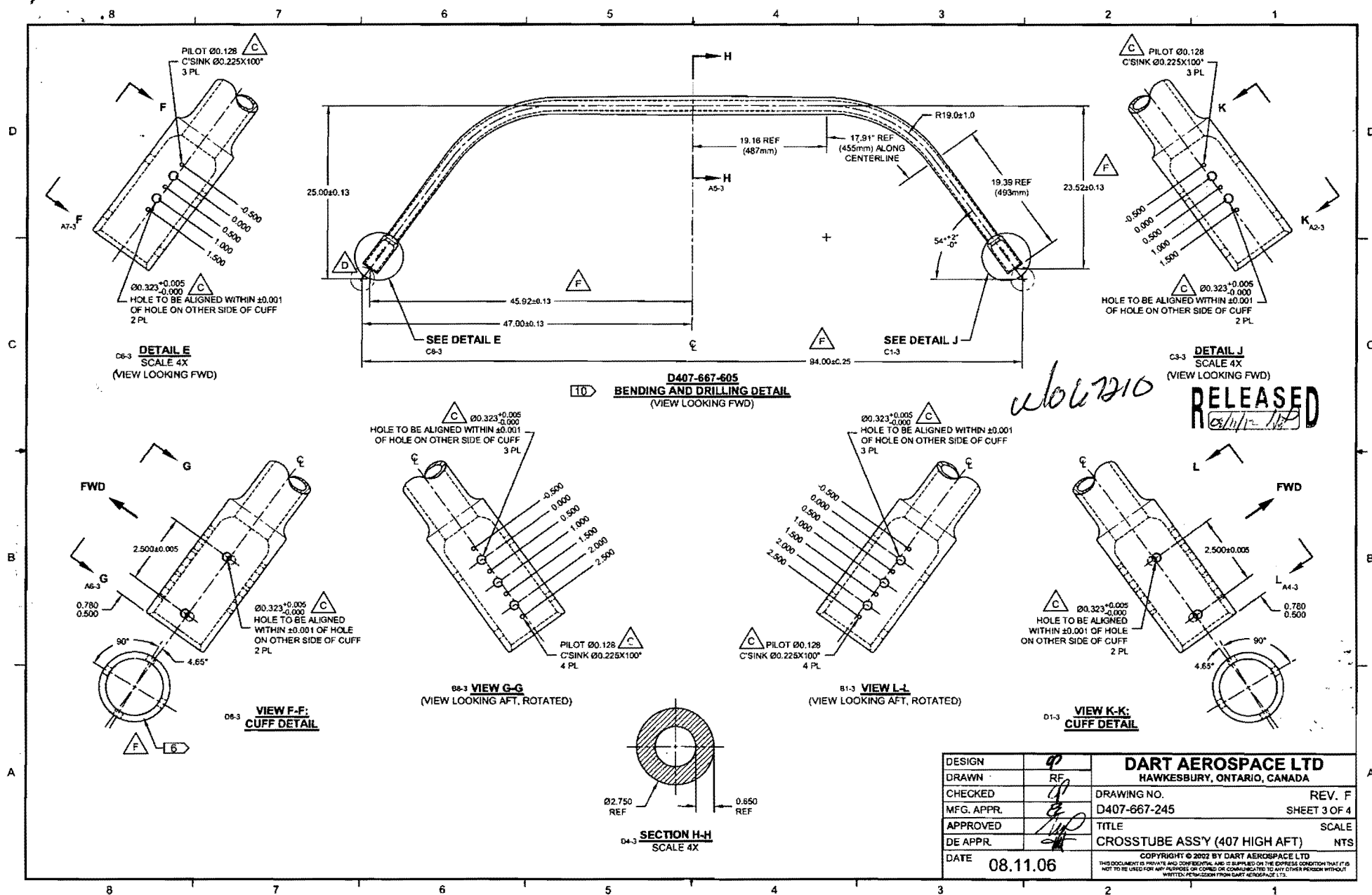
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

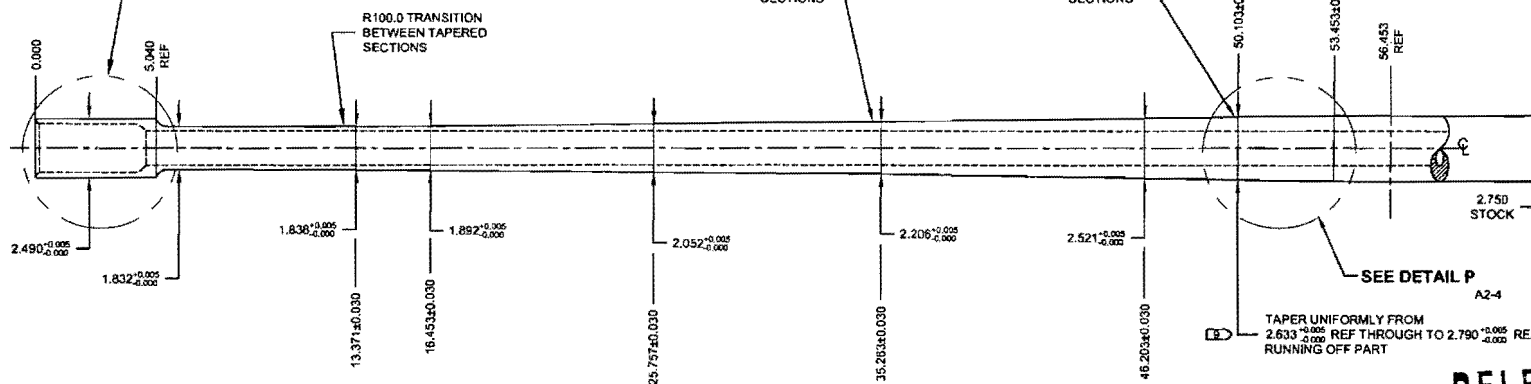
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

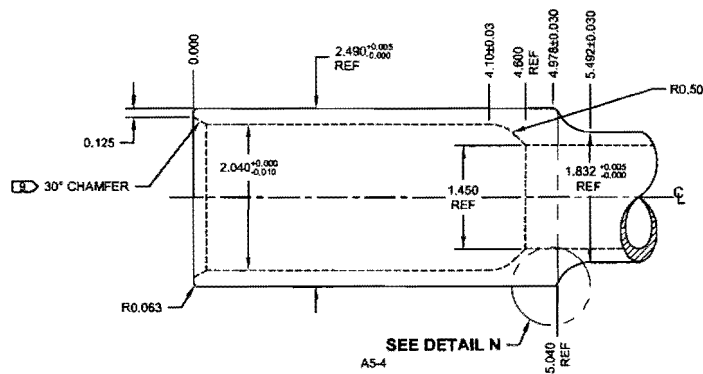
SEE DETAIL M
A7-4



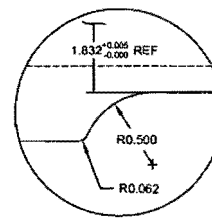
D407-667-245 MACHINING DETAIL

RELEASED
08/11/12

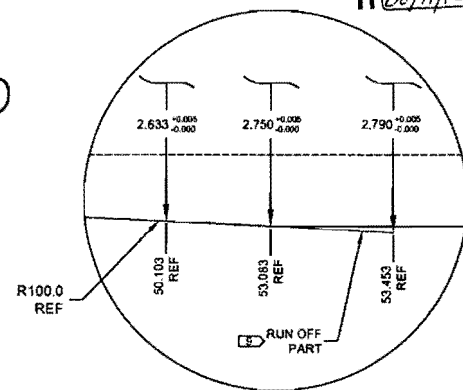
aka 67210



DETAIL M: CROSSTUBE CUFF
SCALE 3X



DETAIL N: CUFF TRANSITION
SCALE 2X



DETAIL P: TAPER RUN-OFF
NOT TO SCALE

DESIGN	<i>40</i>	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	<i>40</i>	DRAWING NO.	REV. F
MFG. APPR.	<i>40</i>	D407-667-245	SHEET 4 OF 4
APPROVED	<i>40</i>	TITLE	SCALE
DE APPR.	<i>40</i>	CROSSTUBE ASS'Y (407 HIGH AFT)	NTS
DATE	08.11.06	COPYRIGHT © 2002 BY DART AEROSPACE LTD	
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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ : Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)					
DATE	STEP	Description of NC Section A	Corrective Action Section B		Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng			

NOTE: Date & initial all entries

5.0 PARTS LIST

Item	Qty -011	Qty -013	Qty -015	Qty -101	Qty -201	Qty -103	Qty -203	Qty -105	Qty -205	Part Number	Description
	X									D206-667-011	SPACER BLOCK KIT
		X								D206-667-013	NUT PLATE KIT (-101/-103/-105/-203/-205)
			X							D206-667-015	NUT PLATE KIT (-201)
				X						D206-667-101	CROSSTUBE INSTALLATION, 206A/B HIGH FWD
					X					D206-667-201	CROSSTUBE INSTALLATION, 206A/B HIGH AFT
						X				D206-667-103	CROSSTUBE INSTALLATION, 206L/L-1/L-3/L-4 HIGH FWD
							X			D206-667-203	CROSSTUBE INSTALLATION, 206L/L-1/L-3/L-4 HIGH AFT
								X		D407-667-105	CROSSTUBE INSTALLATION, 407 HIGH FWD
									X	D407-667-205	CROSSTUBE INSTALLATION, 407 HIGH AFT
1				1						D206-667-141	CROSSTUBE ASSEMBLY, 206A/B HIGH FWD
2					1					D206-667-241	CROSSTUBE ASSEMBLY, 206A/B HIGH AFT
3						1				D206-667-143	CROSSTUBE ASSEMBLY, 206L/L-1/L-3/L-4 HIGH FWD
4							1			D206-667-243	CROSSTUBE ASSEMBLY, 206L/L-1/L-3/L-4 HIGH AFT
5								1		D407-667-145	CROSSTUBE ASSEMBLY, 407 HIGH FWD
6									1	D407-667-245	CROSSTUBE ASSEMBLY, 407 HIGH AFT
10				*2	*2	*2		*2		D2891-1	SUPPORT
11							*2			D2892-1	SUPPORT
12									*1	D2894-1	SUPPORT
13				*2	*2	*2		*2		D2856-400-694	ABRASION STRIP
14							*2		*2	D2856-400-773	ABRASION STRIP
15									*1	D2856-600-851	ABRASION STRIP
16				*4	*4	*4		*4		MS21920-20	CLAMP
17							*4		*4	MS21920-22	CLAMP
18									*2	MS21920-24	CLAMP
19				4	4	4		4		AN5-32A	BOLT
20							4		4	AN5-34A	BOLT
21				4	4	4	4	4	4	MS21042L5	NUT (OR MS21042-5)
22				8	8	8	8	8	8	AN960JD516	WASHER
23									*2	D3190-1	CHAFING SHIELD
30	8									AN4-6A	BOLT
31	8									AN4-7A	BOLT
32	16									AN960JD416	WASHER
33	2									D3193-041	SPACER BLOCK ASSEMBLY
40		2		*2		*2	*2	*2	*2	D2873-043	NUT PLATE
41		2		*2		*2	*2	*2	*2	D2873-045	NUT PLATE
42			2		2					D2872-043	NUT PLATE
43			2		2					D2872-045	NUT PLATE
44		10		10		10				AN5-7A	BOLT
45		10	10		10		10	10	10	AN5-10A	BOLT
46		4	4	4	10	4		4		AN5-30A	BOLT
47		4					4		4	AN5-32A	BOLT
48		18	18	10	12	10	10	10	10	AN960JD516	WASHER
49		4	4		6					MS21042L5	NUT (OR MS21042-5)

*REFERENCE ONLY. PARTS ARE INCLUDED IN D206-667-141/241/143/243, & D407-667-145/245 ASSEMBLIES ABOVE

DART SERVICE INSTRUCTION

TO AMEND INSTALLATION INSTRUCTIONS IIN-D206-667 Rev. C AND
INSTRUCTIONS FOR CONTINUOUS AIRWORTHINESS ICA-D206-667 Rev. 2

REF. CANADIAN STC: SH01-5

REF. FAA STC: SR01304NY

REF. EASA STC: EASA.IM.R.S.01179

REFERENCE ONLY

For D407-667-205 High Aft Crosstube at CHG 007 or later, an inspection window has been added on the underside of the crosstube to facilitate inspection.

IMPORTANT NOTE: If a D407-667-205 Crosstube was stripped of paint, it should now be refinished as follows:

- 1) Apply chemical conversion film material (Alodine 1200 or 1201) per MIL-C-5541 and one coat of MIL-P-85582 or MIL-P-23377 primer.
- 2) Mask underside of crosstube as per hatched area shown in Figure 1.
- 3) Paint outside surfaces of crosstube by applying 2-3 coats of MIL-C-85285 polyurethane paint to match original finish.
- 4) Apply clear coat on inspection window (hatched area).

Additionally, for D407-667-205 High Aft Crosstube at CHG 007 or later, the D2856-400-773 Abrasion Strips have been removed and the D3190-1 Chafing Shields have been bonded onto the crosstube using Proseal 890. For D407-667-205 High Aft Crosstube at CHG 007 or later, amend Parts List of IIN-D206-667 Section 5.0 and ICA-D206-667 Section 32.8 as follows:

Remove:

Item	QTY -205	Part Number	Description
14	*2	D2856-400-773	ABRASION STRIP

If a D3190-1 Chafing Shield is being re-installed on the crosstube, it should now be re-installed as follows:

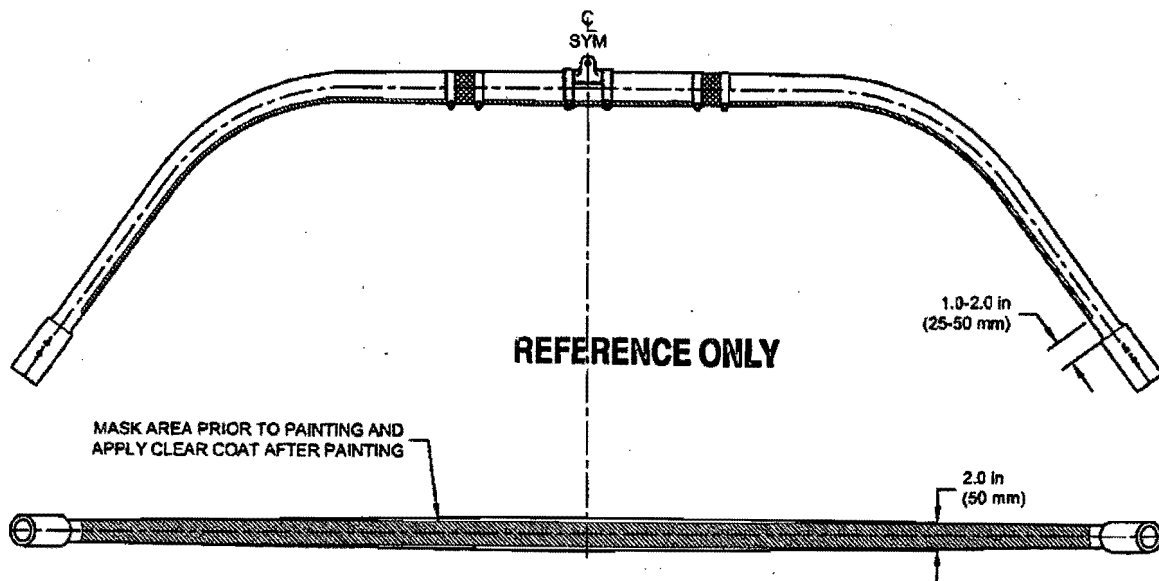
- 1) Follow section 32.1 of ICA-D206-667 for the removal of the crosstubes from the helicopter.
- 2) Remove the qty(2) MS21920-22 Clamps from the crosstube that fasten each D3190-1 Chafing Shield to the crosstube.
- 3) Remove the D2856-400-773 Abrasion Strips from the crosstube per section 32.5 of ICA-D206-667.
- 4) Inspect the crosstube surface where the chafing shields and abrasion strips were installed for corrosion and mechanical damage per items 5.3.1 and 5.3.2 of the 300 hour inspection. Repair damage within acceptable limits per item 5.3.3 of the 300 hour inspection. Touch up finish per item 5.3.9 of 300 hour inspection. If crosstube was stripped of paint, refer to above instructions for suitable refinishing of crosstube.
- 5) Apply a 0.02" to 0.04" (0.5-1.0 mm) thick layer of Proseal 890 on the concave surface of D3190-1 Chafing Shields and let cure per manufacturer's instructions.
- 6) Once the Proseal on the D3190-1 Chafing Shields is cured, apply a thin layer of Proseal 890 on the crosstube to cover the area where the Chafing Shields will be installed.
- 7) Locate the D3190-1 Chafing Shield as shown in Figure 2. Ensure that the overlapping edge of the chafing shield is located at approximately 60° from bottom vertical to prevent deterioration of the rubber bumpers. Be sure to eliminate any air gaps.
- 8) Position and tighten the clamps to a torque of 80-100 in-lb (9.0-11.3 N-m).
- 9) Allow the assembly to cure for 12 hours.
- 10) Re-install the D407-667-205 crosstube per section 32.2 of ICA-D206-667.

CANADA
DEPARTMENT OF TRANSPORT
AIRCRAFT CERTIFICATION
BRANCH
DAO # 01-O-01

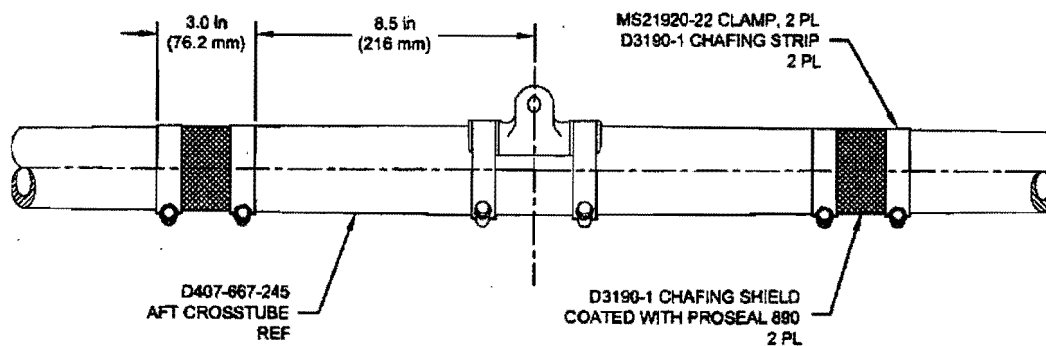
APPROVED
BY: 
D. SHEPHERD (DE # 02)

DATE: 11.04.07
CERT. NO.: SH01-5
ISSUE NO.: 3

A	NEW ISSUE	MB	11.04.07
REV.	DESCRIPTION	BY	DATE
DESIGN		DART AEROSPACE LTD	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. A
MFG. APPR.		DSI 9550	SHEET 1 OF 2
APPROVED		TITLE	SCALE
DE APPR.		D407-667-205 FINISHING CHANGE	NTS
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**FIGURE 1 - INSPECTION WINDOW ON
D407-667-205 CROSSTUBES**



**FIGURE 2 - CHAFING SHIELD
INSTALLATION ON D407-667-205**

CANADA
DEPARTMENT OF TRANSPORT
AIRCRAFT CERTIFICATION
BRANCH
DAO # 01-O-01

APPROVED
BY: *[Signature]*
D. SHEPHERD (DE # 02)

DATE: 11.04.07
CERT. NO.: SH01-5
ISSUE NO.: 3

DESIGN		DART AEROSPACE LTD	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. A
MFG. APPR.		DSI 9550	SHEET 2 OF 2
APPROVED		TITLE	SCALE
DE APPR.		D407-667-205 FINISHING CHANGE	NTS
DATE	11.04.07	COPYRIGHT © 2011 BY DART AEROSPACE LTD	
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RAPPORT D'INSPECTION PAR RESSUAGE

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CLIENT DART AEROSPACE DATE 2011-04-05 HEURE 7:30 AM ☐ PM ☐

ATTENTION LINDA CHANTE N° TRAVAIL 188-11-02070

ADRESSE 1270 ABERDEEN ST N° CLIENT PO/VO 13801

HAWKESBURY, ONTARIO SITE DE TRAVAIL HAWKESBURY

PROJET FPI ON 10 CROSSTUBE ACCEPTATION STD. ASTM E1417 / QSL-038 DATE/REV. 2005

ITEM(S) EXAMINÉ

DESCRIPTION DES TRAVAUX N° PROCÉDURE LT-002 DATE/REV. 2008 N° TECHNIQUE LT-002-Tall-2 DATE/REV.

N° ITEMS MATÉRIEL ALUM. 2024 ÉPAISSEUR VAR. 10

DESCRIPTION wet Fluorescent Liquid Penetrant Inspection

CARRIED OUT ON 100% EXTERNAL SURFACE

DÉTAILS DES INSPECTIONS

MÉTHODE : ☒ FLUORESCENT ☐ VISIBLE ☒ LAVABLE À L'EAU ☐ MÉTHODE DISSOLVANT ☐ PRÉ-EMULSIONNANT

MARQUE : MAGNAFLU LUM. NOIRE S/N 64040704 PUISS. > 1 000 μ W/cm² ☐ AMBIANT < 2 fc

PÉNÉTRANT : 2L67 TEMPS PÉNÉTRATION MIN. 45 MIN. ÉQUIP. LUMIÈRE ☒ LAMP. POCHÉ ☐ LAMP. CULASSE ☐ PUISS. > 100 fc @ SURFACE

DISSOLVANT PÉNÉTRANT H2O TEMPS SÉCHAGE MIN. >10 MIN. AUTRES

RÉVÉLATEUR ST052 TEMPS RÉVÉLATION MIN. 10 MIN. MÈTRE LUM. N/S DATE CAL DUE 07/19/2011

TYPE RÉVÉLATEUR ☒ NON AQUEUX ☐ AQUEUX ☐ SEC 1898866

SURFACE INSPECTÉE

CONDITION SURFACE ☐ MEULÉE ☐ SOUDÉE ☐ MACHINÉE ☐ MRENAILLÉE ☒ MÉTAL PROPRE

TEMPÉRATURE SURFACE ☐ < - 4°C/20°F ☐ - 4°C/20°F À 10° C/50°F ☒ 10°C/50°F À 52°C/125°F ☐ > 52°C/125°F

RÉSULTATS (☐ MÉTRIQUE ☐ IMPÉRIALE)

ITEM	COMMENTAIRES	ACCEPTÉ	REJETÉ
1	CROSSTUBE WO 66346	✓	
1	CROSSTUBE WO 67211	✓	
1	CROSSTUBE WO 67210	✓	
1	CROSSTUBE WO 65700	✓	
1	CROSSTUBE WO 65699	✓	
1	CROSSTUBE WO 67868	✓	
1	CROSSTUBE WO 67869	✓	
1	CROSSTUBE WO 67439	✓	
1	CROSSTUBE WO 67440	✓	
1	CROSSTUBE WO 66345	✓	

Étendue des Services

L'entente selon laquelle le Groupe Acuren Inc. exécute les services ne concerne que les énoncés par écrit. En aucune circonstance ces services ne s'étendent au-delà de l'exécution des services demandés. Il est entendu que toutes les descriptions, les observations et les expressions d'opinions faites par Acuren reflètent les opinions ou les observations de l'entreprise fondées sur l'information et les hypothèses fournies par le propriétaire/opérateur, et elles ne constituent pas des déclarations ou des garanties ou ne peuvent être interprétées comme constituant. Le Groupe Acuren Inc. n'assume aucune des responsabilités du propriétaire/opérateur, et le propriétaire/opérateur conserve la responsabilité entière des décisions prises en matière d'ingénierie, de fabrication, de réparation et d'usage à partir de l'information ou des données fournies par Acuren en rapport avec les services décrits dans les présentes ne peuvent excéder le coût des services rendus.

Norme de Diligence

Dans l'exécution des services, le Groupe Acuren Inc. applique le degré de diligence, le soin et la compétence normalement exercés dans des circonstances semblables par d'autres fournisseurs de ce type de services opérant dans la même localité ou dans une localité similaire. Aucune autre garantie, implicite ou explicite, n'est faite ou voulue par le Groupe Acuren Inc.

SIGNATURES

REPRÉSENTANT Matthew Murdoch FTJ#:

TECHNICIEN (SIGNATURE): David Repach RAPPORT

NOM (MOULÉ): David Repach RÉVISÉ PAR:

1^{er} TECHNICIEN 2nd TECHNICIEN

ONGC NIVEAU 2 SNT NIVEAU _____ ONGC NIVEAU _____ SNT NIVEAU _____

ONGC N° REGISTRATION _____ ONGC N° REGISTRATION _____

